Amendments to the Specification:

Please replace paragraph [0011] with the following amended paragraph:

[0011] Figs. 6A, 6B, 6C, 6D, 6E, ~~and~~ 6F, and 6F-1 illustrate a MEMS device in another embodiment of the invention.

Please replace paragraph [0018] with the following amended paragraph:

[0018] Top layer 100A may include stationary comb teeth 109. In one embodiment, stationary comb teeth 109 provide the electrostatic biasing force used to increase the driving efficiency of the movable structure by tuning its modal frequency. In another embodiment, stationary comb teeth 109 provide the electrostatic driving force to drive scanning mirror 101. In yet another embodiment, stationary comb teeth 109 ~~provides~~ provide both the electrostatic biasing force and the electrostatic driving force.

Please replace paragraph [0025] with the following amended paragraph:

[0025] Referring to Fig. 2C, bottom layer 200B includes a cavity 207 that accommodates the rotation of scanning mirror 201 without touching bottom layer 200B. In one embodiment, stationary comb teeth 210 provide the electrostatic driving force to drive scanning mirror 201. In another embodiment, stationary comb teeth 210 provide the electrostatic biasing force used to increase the driving efficiency of the moving structure. In yet another embodiment, stationary comb teeth 210 provide both the electrostatic driving force and the electrostatic biasing force. Stationary comb teeth 210 are interdigitated with rotational comb teeth 208 when viewed from above.

Please replace paragraph [0027] with the following amended paragraph:

[0027] ~~Fig.~~ Fig. 4A illustrates a MEMS scanning mirror device 400 in one embodiment of the invention. Device 400 includes a top layer 402 bonded atop but electrically insulated from a bottom layer 404.

Please replace paragraph [0028] with the following amended paragraph:

[0028] Figs. 4B and 4C illustrate the details of top layer 402. Top layer 402 includes a top mirror layer 406 having an oblong shape. Top mirror layer 406 includes trenches/grooves 408 on its top surface. Trenches 408 reduce the mass of top mirror layer 406, which in turn minimizes the total

dynamic deformation. By minimizing the total dynamic deformation, the optical resolution of device 400 is improved. Although shown to run along the entire top surface, trenches 408 may be most effective when placed along the outer perimeter of top mirror layer 406 away from a rotational axis 414. As described later, trenches 408 can be etched at the same time as other components by controlling their width so they are not etched through top mirror layer 406. Alternatively, a shadow mask can be used to protect top mirror layer 406 during etching to prevent trenches 408 from etching through. The positions and the number of trenches 408 can be refined through finite element analysis. Gaps 409A and 409B separate top mirror layer 406 from the surrounding components in top layer 402. As described later, the width of gaps 409A and 409B is designed to be greater than the ~~width~~ widths of the gaps around more fragile components so that any trapped gas can escape around top mirror layer 406 instead of the fragile components during the etching process.

Please replace paragraph [0047] with the following amended paragraph:

[0047] In step 10, the top surface of wafer 512 is etched to remove portions of wafer 512 left unprotected by oxide layer 514 to form the components of top layer 402 (Fig. 4C). In one embodiment, wafer 512 is etched using a DRIE process down to the etch stop formed by oxide layer 516. When the top of device 400 is etched through, gas trapped between the bonded wafers 502 and 512 may escape and damage fragile components such as the comb teeth. To prevent such damage, gaps 409A and 409B (Fig. 4C) around top mirror layer 406 (Fig. 4C) are designed to be larger than the gaps around the other components so that oxide layer 516 beneath gaps 409A and 409B [[are]] is etched through before the other gaps. This allows the air to escape around top mirror layer 406, which is a structurally strong component.

Please replace paragraph [0055] with the following amended paragraph:

[0055] Referring to Fig. 4H, the operation of device 400 in another embodiment is explained hereafter. Rotational comb teeth 416 are coupled via bonding pad 424 to receive a steady voltage from voltage source 476 (e.g., a DC voltage source). Stationary comb teeth 434 are coupled via bonding pad 436 to receive an oscillating voltage from AC voltage source 480. Stationary comb teeth 474 (Figs. 4D and 4E) are coupled via bonding pad 472 to receive a steady voltage from DC voltage source 478. Between rotational comb teeth 416 and stationary comb teeth 434, a steady voltage difference changes the natural frequency and the rotation amplitude of device 400 while an AC voltage difference oscillates the mirror at the desired scanning frequency and at the desired

scanning angle. Furthermore, a steady voltage difference between rotational comb teeth 416 and stationary comb teeth 474 (Figs. 4D and 4E) can also be used to change the amplitude of the rotational angle of device 400. The capacitance between rotational comb teeth 416 and stationary comb teeth 474 can also be sensed through respective bonding pads 436 and 472 to determine the rotational angle of device 400.

Please replace paragraph [0059] with the following amended paragraph:

[0059] Fig. 6A illustrates a MEMS scanning mirror device 600 in one embodiment of the invention. Device 600 includes a top layer 602 ~~bond~~ <u>bonded</u> atop but electrically insulated from a bottom layer 604.

Please replace paragraph [0060] with the following amended paragraph:

[0060] Figs. 6B and 6C illustrate the details of top layer 602. Top layer 602 includes a mirror 606 having an oblong shape. The bottom surface of mirror 606 serves as the reflecting surface. The top surface of mirror 606 includes trenches/grooves 608A, 608B, 608C, and 608D. Trenches 608A are formed along the top outer perimeter of [[top]] mirror 606 while trenches 608B are formed along the bottom outer perimeter of [[top]] mirror 606. Trenches 608C and 608 are formed on the midsection of mirror 606. Trenches 608A, 608B, 608C, and 608D reduce the mass of mirror 606, which in turn minimizes the dynamic deformation of [[top]] mirror 606. By minimizing dynamic deformation of mirror 606, the optical resolution of device 600 is improved. As described later, trenches 608 can be etched at the same time as other components by controlling their width so they are not etched through [[top]] mirror ~~layer~~ 606. Alternatively, a shadow mask can be used to protect [[top]] mirror ~~layer~~ 606 during etching to prevent trenches 608 from etching through. The mirror mass and inertia can be further reduced after the fabrication process by laser trimming. This method can adjust the mirror natural frequency. The effective place to remove the mirror mass is the area around the top and bottom outer perimeters of mirror 606. Therefore, areas on mirror 606 can be reserved for the laser trimming process.

Please replace paragraph [0061] with the following amended paragraph:

[0061] As described later, trenches 608 can be etched at the same times as other components by controlling their width so they are not etched through mirror 606. The trenches were designed to remove the mirror mass around the mirror tips and outer diameter. This will effectively reduce the

mirror inertia and reduce the mirror dynamic deformation. The positions and the number of trenches 608 can be refined through finite element analysis. Gaps 609A and 609B separate mirror 606 from the surrounding components. As described later, the width of gaps 609A and 609B is designed to be greater than the ~~width~~ widths of gaps around more fragile components so that any trapped gas can escape around mirror 606 instead of the fragile components during the etching process.

Please replace paragraph [0067] with the following amended paragraph:

[0067] Figs. 6D, 6E, [[and]] 6F, and 6F-1 illustrate the details of bottom layer 604. Bottom layer 604 includes an opening 665 that accommodates the rotation of mirror 606 without touching bottom layer 604. As shown in Fig. 6F, the bottom surface of bottom layer 604 includes assembly alignment marks 666 for aligning other structures with mirror 606.

Please replace paragraph [0080] with the following amended paragraph:

[0080] In step K, the top surface of wafer 712 is etched to remove portions of wafer 712 left unprotected by oxide layer 714 to form the components of top layer 602 (Fig. 6C), alignment marks 721 and separation trench 719. In one embodiment, wafer 712 is etched using a DRIE process down to the etch stop formed by oxide layer 716. When the top of device 600 is etched through, gas trapped between the bonded wafers 702 and 712 may escape and damage fragile components such as the comb teeth. To prevent such damage, gaps 609A and 609B (Fig. 6C) around [[top]] mirror 606 (Fig. 6C) are designed to be larger than the gaps around the other components so that oxide layer 716 beneath gaps 609A and 609B [[are]] is etched through before the other gaps. This allows the air to escape around [[top]] mirror 606, which is a structurally strong component.